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Effects and Costs of Day Care and Homemaker Services for the Chronically Ill: A Randomized Experiment

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
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National Center for Health Services Research
Research Summary Series

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Abstract

The study was a randomized experiment carried out by the National Center for Health Services Research to examine the effects of adult day care and homemaker services on a Medicare-eligible population and to assess the impacts of those services on institutionalization and Medicare costs. Differences between experimental and control groups in health outcomes and psycho-social measures also were compared, and patients were identified for whom the new services might prove more effective than existing options. Difficulty in enrolling patients in the program and low utilization rates for some groups of patients may suggest low demand for these services. The study also suggests that for the majority of patients, day care and homemaker services probably served as additional benefits under Medicare, rather than substitutes for nursing home care. Net total Medicare costs (the new services plus existing Medicare services) were 71 percent higher for the day care experimental group and 60 percent higher for the homemaker experimental group. Experimental/control group differences in physical functioning, psycho-social measures, and death rates are also discussed in this article.

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This *Research Summary* reports on findings from a study conducted by NCHSR's Division of Intramural Research. The summary was written by William G. Weissert, Ph.D., Research Project Manager; Thomas T.H. Wan, Ph.D.; and Barbara Livieratos, M.A. Members of the Research Advisory Committee were Sidney Katz, M.D., Chairman; Robert F. Boruch, Ph.D.; David L. Rabin, M.D.; Allen J. Reilly, C.P.A.; and Philip G. Weiler, M.D., M.P.H.

The more detailed technical report summarized here may be obtained by contacting the Long Term Care Cluster, Division of Intramural Research, National Center for Health Service Research, Hyattsville, MD. 20782 (tel.: 301-436-6930).

Other NCHSR publications of related interest include a research summary entitled *Assessing the Quality of Long-Term Care*, (PHS) 78-3192, available from NCHSR, and the full report *An Approach to Assessment of Long-Term Care*, order number PB 271 389, for sale from NTIS. Another research summary, *Development of Criterion Measures of Nursing Care*, also is available from NCHSR, with the full report for sale from NTIS. The two-volume report is entitled: *Reliability Test Results and Instrument of Health Status Measures* (vol. I), PB 267 004, and *Manual for Instrument of Health Status Measures* (vol. II), PB 267 005.

NCHSR publications are available on request from NCHSR, Publications and Information Branch, Room 7-44, 3700 East-West Highway, Hyattsville, MD 20782 (tel.: 301/436-8970).

The views expressed in this publication are those of the authors, and no official endorsement by the National Center for Health Services Research is intended or should be inferred.

Foreword

The elderly are the fastest growing segment of the United States population. It is estimated that by the year 2000 there will be a 35 percent rise in the number of people more than 65 years old—from 23.5 million to 31.8 million people. The growing number of elderly has directed increasing attention to issues in long-term care.

An often noted problem in the long-term care system is its lack of appropriate alternative settings from which a patient and his or her caretaker can choose. Existing reimbursement mechanisms tend to favor institutional care, and there has been little incentive to develop alternatives. The 1972 amendments to the Social Security Act, specifically P.L. 92-603, Section 222, authorized experiments and demonstrations to assess alternatives in long-term care.

The study described here was undertaken by the National Center For Health Services Research in response to that Congressional mandate. It examines the impacts of two services often considered to be promising alternatives to institutionalization: adult day care and homemaker services.

The study design employed was the randomized experimental approach, which maximizes internal validity and increases the extent to which detected effects can be attributed to the new services. The researchers have sought to determine the effects of the new services on institutionalization, on the use and costs of Medicare services, on physical functioning levels, and on three quality of life indicators.

Viewed in light of the current growing concern over health care costs and Medicare payments, this study is both timely and policy-relevant. It asks important questions and seeks answers to them in a methodologically sound manner, thus making a useful contribution to public policy formulation and the progress of health services research.

Gerald Rosenthal, Ph.D.
Director

August 1979

Statement of the research advisory committee

The social experiment that is the subject of this report was a unique undertaking in the history ofhealth-related activities sponsored by the Federal government. Many agencies combined their separate resources to achieve a common purpose, namely, the provision of meaningful information about the effectiveness of selected rehabilitative and supportive services for the large and increasing number of vulnerable senior citizens in the United States. Representatives of the public and private sectors cooperated to finance, organize, deliver, and evaluate the services. Design and accomplishment of this social experiment required continuous commitment of a partnership of people who had sophisticated capabilities in the complex areas of long-term care and its evaluation.

The Research Advisory Committee, itself, represented a combination of public and university peers who monitored the evaluation activities and who provided critical, formative input at all stages. The Committee evaluated the design and its implementation. On-site evaluation covered the research process at demonstration sites, information-processing by the evaluation contractor, and analytic activities of the National Center for Health Services Research. Such monitoring revealed that all reasonable efforts were made to face and resolve issues of research design and implementation. The committee's recommendations, for example, were followed with regard to problems of invalid cases and related complexities of analyses. Recommendations to use multi-stage analysis were accepted, as was advice concerning the importance of drawing conclusions that recognize the constraints of the design.

The report presented here will raise important questions among peers in the areas of both long-term care policy and research. The voluminous amount of information permits and requires further analyses to answer such questions. The report should be considered to be a high quality summary of analyses made to date, yet subject to continuing synthesis on the basis of prioritized questions from the field. The Committee considers the efforts of the authors and all participants to be worthy of much respect.

Sidney Katz, M.D.
Chairman

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Introduction

Institutionalization has become a common recourse for those in need of long-term care, especially for the elderly. Indeed, many believe that there is an over-reliance on institutional care because of the lack of non-institutional care settings from which a patient and his or her caretaker or doctor can choose.[9 11 13] In reviewing recent studies on institutionalization, the Congressional Budget Office[16] found that many institutionalized patients were inappropriately served. Practitioners and researchers alike have suggested that alternatives to institutionalization should be provided to offer comprehensive health and supportive services. Research has shown that some alternatives might also be cheaper.[17]

The study reported here was a randomized experiment carried out by the National Center for Health Services Research. Its purpose was to test the effects of adult day care and homemaker services on a Medicare-eligible population. Specifically it sought to determine:

1. Would day care or homemaker services reduce institutionalization?
2. What would their effects be on use and costs of other Medicare services? and
3. Would day care or homemaker services improve or maintain physical and/or psycho-social functioning at levels as high or higher than existing care options?

To answer these cost and quality questions the study was designed as a comprehensive assessment of the impacts of day care and homemaker services on institutionalization and Medicare costs. Differences between experimental and control groups in health outcomes also were compared, and patients were identified for whom the new services might prove more effective than existing options.

Day care

2 Adult day care, though not yet widely used in this country, has been extensively used in Europe, especially in England, where it has functioned as an alternative to institutional residency for over two decades and is part of the national health service.[5 7] American interest has been slower to take hold, but there has been some research on the comparatively few day care centers operating in the United States.

A 1975 National Center for Health Services Research descriptive study of ten adult day care centers led to identification of two discrete models.[18 19] Model I or "Day Hospital" programs were typically affiliated with health care institutions and drew their patients from them. These programs had a strong health care orientation and sought physical rehabilitation as a treatment goal. Model II or "Multipurpose" programs did not provide rehabilitative care, focusing instead on less infirm participants' needs for social interaction and activities. Most participants came from the community rather than from hospitals, reflecting the fact that most Model II programs were affiliated with community service agencies rather than health care institutions.

The four day care demonstration projects which provided service in the experimental study reported here were required to be of the Model I variety, serving infirm patients with health care as well as social services. To ensure that all four programs had a strong health care and therapeutic capability, draft regulations were prepared for use in conjunction with the experiments. They defined day care as follows:

> Day care is a program of services provided under health leadership in an ambulatory care setting for adults who do not require 24-hour institutional care, and yet, due to physical and/or mental impairment, are not capable of full-time independent living. Participants are referred to the program by their attending physician or by some other appropriate source such as an institutional discharge planning program, a social service agency, etc. The essential elements of a day care program are directed toward meeting the health maintenance and restoration needs of participants. However, there are socialization elements in the program which, by overcoming the isolation that is so often associated with illness in the aged and disabled, are

considered vital for the purpose of fostering and maintaining the maximum possible state of health and well-being.[14] *

The programs also were required to provide 13 specific services: nursing, podiatry, patient activities, social services, personal care, nutrition services, meals, transportation, physical therapy, eye examinations, and hearing examinations.

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* Day care services were considered a Part B Medicare benefit, and consequently eligibility was not made contingent upon a recent hospital stay.

Homemaker services

4 Medicare presently authorizes a home health aide to perform personal care and certain limited household services which include changing the bed, light cleaning, food shopping, and help in cooking. Homemaker services which would significantly increase the length of the visit are not reimbursable. These restrictions were waived in the homemaker demonstrations in this study, as was a Medicare requirement that another service be provided in conjunction with home health services. The existing requirement that patients who receive homemaker services must have been recently hospitalized was kept intact. (In other words, homemaker services were considered a Medicare Part A benefit.)

Homemaker services consisted of: home management (cooking, cleaning, laundry, and related tasks); personal care (assistance in bathing, dressing, eating, walking, skin care, etc.); supportive activities (tasks outside the home, such as shopping); and health care management services (such as accompanying the patient to health care services and working with others during a home health visit).

Data and methods

In this study a pool of Medicare-eligible individuals were carefully screened to determine whether, in the judgment of assessment teams made up of health care professionals, the patient could be appropriately served with day care or homemaker services. If the decision was "no" (which happened infrequently, sometimes because the patient needed institutional care), he or she was rejected from the study and referred to a more appropriate source of care. If the decision was "yes," then the random procedure was initiated; half of the selected patients were admitted to day care or homemaker services (or both), while the other half were not. (Before they were assessed, patients were fully and carefully informed, verbally and in writing, that their chances of being admitted to care were only 50 percent because the care was being offered as part of an experimental study.)

If assignment was to the experimental group, the patient became eligible for one or the other or both the new services for one year. Patients also continued to be eligible for existing Medicare services which include hospital and skilled nursing inpatient and outpatient care, home health visits, physician visits, and a variety of other ambulatory services. The control group also remained eligible for these existing Medicare services but was not eligible to receive the new services.

The new services were provided by non-randomly selected health care providers in six United States cities. Their costs were reimbursed by Medicare under provisions of Section 222 of the 1972 amendments to the U.S. Social Security Act which permits special waivers of usual Medicare regulations when research such as this is being conducted.

Patient data were collected five times during the study year; once at the initial assessment, and then quarterly for the next four quarters. The data collection instrument, which was designed specifically for this study, included Katz's Index of Activities of Daily Living,[10] an Instrumental Activities of Daily Living Scale,[13] Kahn's Mental Status Questionnaire,[9] a contentment scale,[1] and a social activity scale.

The study design called for establishing three study groups:

- Study Group 1 was day care patients and a control group,
- Study Group 2 was homemaker patients and a control group,
- Study Group 3 was a smaller group of patients who received both services and a control group.

Problem cases

6 Although the study was a carefully designed randomized experiment, social research always produces problems which make the study depart in some ways from the ideal design. A frequent way in which design departures took place is that some patients who were randomly assigned to receive the new services subsequently found themselves unable or unwilling to use them.

Among the *day care* group there were 77 such patients, or 25 percent of those originally assigned to receive the new service. Specific reasons for nonuse of services were not collected on other than an anecdotal basis, but indications were that for many, their health status prevented attendance. This is indicated by the fact that those who were assigned but did not use the services tended to be older and sicker, and later proved to be more likely to die or be institutionalized than those who were assigned and did use the service. The nonusers also were somewhat more likely to be white, live alone, be severely dependent, and have been hospitalized shortly before the study began. Among these characteristics, however, only the prevalence of death was statistically significantly higher for the assigned nonuser group compared to those who used the service. (Among the assigned nonusers, 35 percent died during the study year while among assigned users, only 14 percent died—a difference of 21 percent.)

Patients assigned to *homemaker services* were similarly split into users and older, sicker nonusers. Of those assigned, 81 patients, or 20 percent did not use the services. Nonusers were 17 percent more likely to die (46 percent of assigned nonusers died versus 29 percent for assigned users); more likely to be severely or minimally dependent; and more likely to live with others, be nonwhite, and be male. They were *less* likely to be institutionalized than those who did use services, a finding which is consistent with overall study findings discussed later.

Those assigned to both services had the highest rate of nonuse: 49 percent (71 patients) failed to use one or both of the combined services. Broken down by specific nonuse: Of the original group, 11 patients (8 percent of all those assigned to both services) failed to use either day care or homemaker services; 26 patients (18 percent) used day care but not homemaker services; and 34 patients (23 percent) used homemaker services but not day care. Nonusers were more likely than users to be female, over 74, living with others, severely dependent, and they were more likely to die or be institutionalized. However, none of these differences was statistically significant.

Another group of patients departed from the research design in roughly the opposite way: They were assigned to the control group but found they were

eligible to receive similar services from a nonstudy-funded source such as Medicaid covered day care services in New York, or U.S. Social Security Act Title XX Social Services funded chore services in California. A few patients received the study services from the study providers even though they were assigned to the control group. Still other patients dropped out of the study and therefore could not be assessed at one or more quarterly intervals or at the end of the treatment period. For a few other patients, the assessment teams which conducted the patient assessments did not fill in a crucial data item relating to activities of daily living. These patients were classified as missing cases. Still other patients were accepted without following the randomization procedures. These patients were classified as problem cases. Chart I presents a breakdown.

Chart 1. Problem cases

Original total		1871
Missing and invalid:		
Missing key data on 1st assessment	13	
Missing 5th assessment	241	
Not randomly assigned	48	
Died during first quarter	5	
Sub-total	(305)	
New total		1566
Nonusers:		
Assigned to E group, but did not use services	158	
Assigned to receive both services but used neither or only one	71	
Sub-total	(229)	
New total		1337
Other contaminated cases:		
Project participants who used unassigned services from:		
Title XVIII	13	
Title XIX	38	
Title XX	129	
Private payment	4	
Sub-total	(184)	
New total		1153

Compensating procedures in the analysis

8 To compensate for these departures, careful steps were taken in the analysis to assess their effects and consider them in drawing conclusions. In short, the analysis was conducted three times, each time with a different mix of cases drawn from problem and nonproblem cases: experimental and control groups with contaminated cases removed were compared; users were compared to nonusers; and experimental and control groups with contaminated cases included were compared. Such a multi-stage analysis has been advocated by evaluation researchers.[2 3 4]

Results of all three analyses are included in the final report of the project, however, only one set is included in this paper.* The tables included here are based on a comparison of those who got only what they were randomly assigned to get with those control group members who got nothing similar to the experimental services. Though the magnitude of differences was smaller in the subsequent analyses, the direction of difference between the experimental and control groups did not change.

* Order information for the final report is on page ii.

Generalizability of findings

The issues discussed above concern the extent to which effects detected can be attributed to the new services. Researchers call this internal validity, and the experimental design employed is the best way of maximizing it. Often, however, maximizing internal validity results in a trade-off in external validity, which is the extent to which the findings from the study can be applied to other real life settings. Three characteristics of the study limit its external validity:

1. The day care and homemaker service contractors were not chosen randomly. They were selected through the competitive bidding process as the most qualified applicants among those who chose to enter competition for the right to participate in the study. Consequently, the results achieved here may be in part due to some special characteristics of the day care and homemaker providers who participated. Results they achieved might not be achieved by providers with less skill, interest, or experience.

2. The patients who participated in this experiment were probably not representative of all patients who would become eligible for day care and homemaker services if these services were well established and universally available. Patients who participated were only those who were referred by providers and social service agencies which knew about the new services. Some providers may not have learned about the study despite extensive efforts to communicate information to them. Some patients who knew about the service might have declined to seek admission because they did not like the temporary nature of the study, or because they wanted to avoid being studied.

3. The study was an experiment. Consequently, it was not "real life," and as such, staff and patients may have acted differently than they would have if they had not been participants in a study.

These factors are important limitations on the extent to which the findings from this study can be generalized to other patients served in other settings. Hence, caution dictates that a careful consideration of similarities and differences between the study's patients and providers and other patients and providers be made before conclusions are drawn. It should be noted, however, that such limitations apply to any study of a service not yet developed and in wide use.

Patient characteristics

10 Table 1 presents characteristics of the three study groups at the time the study began. It shows that day care study group members were roughly evenly split between the "old" and the "old old," that is under 74 versus over 75 years of age. Homemaker study group members were more likely to be "old old." Females predominated in all three study groups, but less so in day care than the others. Day care patients were more likely to live with others. About half of homemaker patients lived alone. Dependency was evenly distributed throughout the three study groups. All homemaker patients had been hospitalized within the two weeks prior to their admission to the study. Day care patients included those coming from hospitalization as well as those coming from the community. There were two areas in which there were significant differences between experimental and control groups: Day care experimental group members had a higher prevalence of circulatory disorders than did the control group; and homemaker experimental group members had a higher prevalence of moderate dependency compared to the control group.*

* Other small differences existed between the experimental and control groups in some subgroups. Such differences, even though not statistically significant, might have influenced patient outcomes. Implications are discussed in the full report of the study.

Table 1. Comparison of experimental and control groups' characteristics in three study groups, at the time the study began (n = 1,153).[1]

Patient characteristics and groups	*Study Group 1 Day care (n = 384)* (n)	%	*Study Group 2 Homemaker (n = 630)* (n)	%	*Study Group 3 Both (n = 139)* (n)	%
Age						
Under 75						
Experimental	(101)	52	(138)	45	(33)	56
Control	(91)	48	(149)	46	(34)	43
Over 74						
Experimental	(93)	48	(169)	55	(26)	44
Control	(99)	52	(174)	54	(46)	58

(continued)

Table 1. Comparison of experimental and control groups' characteristics in three study groups, at the time the study began (n = 1,153).[1] (continued)

Patient characteristics and groups	Study Group 1 Day care (n = 384) (n)	%	Study Group 2 Homemaker (n = 630) (n)	%	Study Group 3 Both (n = 139) (n)	%
Sex						
Male						
Experimental	(85)	44	(78)	25	(19)	32
Control	(75)	40	(93)	29	(30)	38
Female						
Experimental	(109)	56	(229)	75	(40)	68
Control	(115)	61	(230)	71	(50)	63
Race						
White						
Experimental	(155)	80	(278)	91	(49)	83
Control	(154)	81	(269)	83	(69)	86
Nonwhite						
Experimental	(39)	20	(29)	9	(10)	17
Control	(36)	19	(54)	17	(11)	14
Living arrangement						
Alone						
Experimental	(45)	23	(164)	53	(32)	54
Control	(50)	26	(155)	48	(34)	43
With Others						
Experimental	(149)	77	(143)	47	(27)	46
Control	(140)	74	(168)	52	(46)	58
Primary diagnosis						
Circulatory disorders						
Experimental	(86)	44	(83)	27	(19)	32
Control	(64)	34*	(110)	34	(33)	41
Injuries						
Experimental	(18)	9	(35)	11	(9)	15
Control	(26)	14	(42)	13	(12)	15
Cancer						
Experimental	(3)	2	(45)	15	(2)	3
Control	(2)	1	(46)	14	(2)	3
Dependency [2]						
Minimal						
Experimental	(56)	29	(72)	24	(13)	22
Control	(54)	28	(96)	30	(16)	20
Moderate						
Experimental	(32)	17	(82)	27	(16)	27
Control	(28)	15	(52)	16*	(22)	28
Severe						
Experimental	(106)	55	(153)	50	(30)	51
Control	(108)	57	(175)	54	(42)	53

Table 1. Comparison of experimental and control groups' characteristics in three study groups, at the time the study began (n = 1,153).[1] (continued)

Patient characteristics and groups	Study Group 1 Day care (n = 304) (n)	%	Study Group 2 Homemaker (n = 630) (n)	%	Study Group 3 Both (n = 139) (n)	%
Recent hospitalization						
Yes						
Experimental	(45)	23	(307)	100	(59)	100
Control	(57)	30	(323)	100	(80)	100
No						
Experimental	(149)	77	(0)	0	(0)	0
Control	(133)	70	(0)	0	(0)	0

[1] Excludes invalid cases, those missing essential first assessment data items or entire last assessment, experimental cases which did not use assigned services, and control and experimental cases which received homemaker, chore, or day care services under Medicaid or Title XX.

[2] Minimally dependent patients are those who require no human assistance in bathing, dressing, eating, transferring, toileting, or continence. Moderately dependent patients require human assistance in bathing or dressing, but not in eating, transferring, or toileting, and they are continent. Severely dependent patients require human assistance in eating, transferring, or toileting, and they are incontinent of bowel or bladder. The rationale for these distinctions is that only the last category of patients requires continuous or nearly continuous assistance of another human being, thereby making their dependency severe.

*Difference is significant at .05 or less.

Findings

Day care services: Day care patients averaged 70 days of day care per year (Table 2). Patients who were over 74 years of age and those who had not come to the program from a recent hospitalization had the lowest average attendance, 63 days. Those who had been recently hospitalized had the highest attendance, 91 days.

Variation by quarter was studied to determine whether or not differential use patterns existed. The analysis showed that the majority of patients (58 percent) spread their attendance out more or less evenly through the four quarters of the study year. These "regular users" averaged 100 days attendance for the year. They were likely to be severely dependent white females, many of whom had been hospitalized within the two weeks prior to entry into the day care study.

Most of those who concentrated their use into the first two quarters attended infrequently or not at all during the last two quarters. They were more likely to be white than nonwhite, they were as likely to be male as female, and they represented all three levels of physical dependency.

Other factors analyzed suggest that the most important reason for this pattern of use was probably a substantial change in health status resulting in institutionalization or death. Among those who used day care primarily in the first and second quarters, 10 percent entered a skilled nursing facility, 49 percent entered a hospital, and 25 percent died. Some (16 percent) stopped using day care for other reasons, probably including recovery of their health status to the point at which they no longer needed care. (About half of these "first two-quarter-users" maintained or improved their physical functioning abilities during the study year.)

Day care patients averaged four days per year of skilled nursing facility inpatient care, but control group members averaged nine days. This difference is statistically significant.

An important finding concerning nursing home use is the overall rate of use of skilled nursing facilities by either the experimental or control group. The proportions were 11 percent for the experimental group and 21 percent for the control group. These figures suggest that large proportions of the experimental and control groups were probably not bound for a nursing home when they entered the day care study. Even allowing for those who died during the study year, at least 79 percent of the control group stayed out of nursing homes without use of day care. Consequently, it must be assumed that for a significant proportion of the experimental group day care served as an additional benefit

under Medicare, rather than one which was substituted for nursing home care.

Relatively small experimental and control group differences were found for hospital use. Those in the experimental group used fewer days of hospital care during the year than the control group (10 days versus 13 days). Differences were not statistically significant.

Those who showed the largest benefits in avoiding institutionalization compared to the control group were: (1) patients who were recently hospitalized, (2) those whose primary diagnosis was an injury, (3) those who were severely disabled, and (4) those who were nonwhite. Those who lived alone had fewer hospital days in the control group than those in the experimental group (Table 2).

Study Group 1

Table 2. Day care utilization and its impacts on institutionalization, dependency, and total Medicare payments for 384 patients[1] with selected characteristics, comparing experimental and control groups.

Patient characteristics and groups		Day care days	SNF[2] days	Hospital days	Maintained or increased independence[3] %	Total Medicare[4] payments $
Age						
Under 75						
Experimental	(101)	76	5	11	75	.7310
Control	(91)	0	7	15	56**	4232**
Over 74						
Experimental	(93)	63	4	10	59	5822
Control	(99)	0	10*	11	54	3419**
Sex						
Male						
Experimental	(85)	71	4	10	67	6875
Control	(75)	0	6	11	53	3762**
Female						
Experimental	(109)	69	4	10	66	6365
Control	(115)	0	10*	14	56	3839**

(continued)

Table 2. Day care utilization and its impact on institutionalization, dependency, and total Medicare payments for 384 patients[1] with selected characteristics, comparing experimental and control groups. *(continued)*

Patient characteristics and groups		*Day care days*	*SNF[2] days*	*Hospital days*	*Maintained or increased independence[3]* %	*Total Medicare[4] payments* $
Race						
White						
Experimental	(155)	71	4	11	70	6737
Control	(154)	0	10**	12	57*	3921**
Nonwhite						
Experimental	(39)	65	5	8	59	5563
Control	(36)	0	2	17	44	3329
Living arrangement						
Alone						
Experimental	(45)	74	3	11	67	6086
Control	(50)	0	8	8	50	2556**
With Others						
Experimental	(149)	68	5	10	68	5626
Control	(140)	0	9	14	56*	4256**
Primary diagnosis						
Circulatory disorders						
Experimental	(86)	76	2	10	67	6445
Control	(64)	0	6	13	55	4127
Injuries						
Experimental	(18)	77	15	9	83	6096
Control	(26)	0	28	8	73	2883**

Table 2. Day care utilization and its impact on institutionalization, dependency, and total Medicare payments for 384 patients[1] with selected characteristics, comparing experimental and control groups. *(continued)*

Patient characteristics and groups		*Day care days*	*SNF[2] days*	*Hospital days*	*Maintained or increased independence[3]* %	*Total Medicare[4] payments* $
Dependency[5]						
Minimal						
Experimental	(56)	66	1	11	61	6226
Control	(54)	0	0	9	56	2766**
Moderate						
Experimental	(32)	72	3	12	63	7054
Control	(28)	0	6	15	36*	5062
Severe						
Experimental	(106)	71	6	9	73	6479
Control	(108)	0	14*	14	59*	3999**
Recent hospitalization						
Yes						
Experimental	(45)	91	11	11	78	7212
Control	(57)	0	25*	15	67	4902*
No						
Experimental	(149)	63	2	10	64	6286
Control	(133)	0	2	11	50*	3340**
All patients						
Experimental	(194)	70	4	10	68	6501
Control	(190)	0	9*	13	55**	3809**

[1] Excludes invalid cases, those missing essential first assessment data items or entire last assessment, experimental cases which did not use assigned service, and control and experimental cases which received homemaker, chore, or day care services under Medicaid or Title XX. With these cases excluded, these results probably overstate the magnitude of day care effects.

[2] Skilled nursing facility days covered by Medicare only. Medicaid covered skilled nursing facility days and Medicaid covered intermediate care facility (long-term) days are not included since this table compares only Medicare payments.

[3] Physical functioning was measured as ability to perform six activities of daily living: eating, bathing, dressing, transferring (moving from bed to chair), toileting, and continence of bowel or bladder. These activities comprise the Katz ADL scale, a widely used measurement of physical dependency.

[4] Medicare reimbursements usually cover hospitalization, skilled nursing facility stays, outpatient department services, home health agency visits, and ambulatory services. Ambulatory services include physician visits, laboratory work, ambulances, therapies, prosthetic devices, and durable medical supplies. In addition to these usual Medicare services, the figures presented here include reimbursements for the experimental day care services.

[5] Minimally dependent patients are those who require no human assistance in bathing, dressing, eating, transferring, toileting, or continence. Moderately dependent patients require human assistance in bathing or dressing, but not in eating, transferring, or toileting, and they are continent. Severely dependent patients require human assistance in eating, transferring, or toileting, or they are incontinent of bowel or bladder. The rationale for these distinctions is that only the last category of patients requires continuous or nearly continuous assistance of another human being, thereby making their dependency severe.

* Difference is significant at .05 or less.

** Difference is significant at .01 or less.

A larger proportion of the experimental group maintained or improved its functioning ability compared to the control group. Patients most likely to benefit were those under 75 years of age, white patients, those living with others, the moderately and severely dependent, and those who had not been hospitalized before the study began.

It should be noted, however, that these results are based upon a definition of physical function which includes dying as the worst level of functioning. In other words, if a patient needed substantial assistance at the beginning of the study and was dead at the end of the study, he or she was not dropped from the analysis. Death was scored as a still further decline in functioning ability. Certainly death is the lowest level of functioning, and it would be misleading to exclude those whose functional ability dropped to that level. Other researchers have used a similar approach.[15]

Yet, the question of whether or not day care actually affected functional ability among those who remained alive was not directly answered using this approach. Consequently, the data were run again on only those who remained alive. Once again, the experimental group did better than the control group, but the magnitude of the differences was not as large as it was with deaths included, and the results were not statistically significant.

Quarterly data were used to assess the likelihood that beneficial effects on physical functioning would persist after the study ended. Figures 1 and 2 show ADL (Activities of Daily Living) scores for the day care study group at each assessment. The scores range from no dependencies at all (0) to death as the lowest functional state (7).

ADL scores can be expected to decline in such an elderly population, and a decline is shown for both groups. The effect of day care on functioning is shown in slowing this rate of decline: The lines in Figure 1 (which includes values for death) show that day care patients deteriorated at a slower rate than control group patients. Yet, the trend lines are inconclusive with respect to potential for continued effects after the study ended, because between the fourth and fifth quarter the control group showed improvement while the experimental group continued to decline.

One possible explanation for this shape of the curve is that the final patient assessment included more control group cases than the interim assessments. As more control group members—presumably those at improved functional levels—were included in the last assessment, the rate of decline for the control group was slowed, thus narrowing the gap between the two groups.*

On the other hand, day care apparently did keep some patients alive who probably would have died had they been in the control group. Consequently, many of those with the lowest functioning levels died in the control group,

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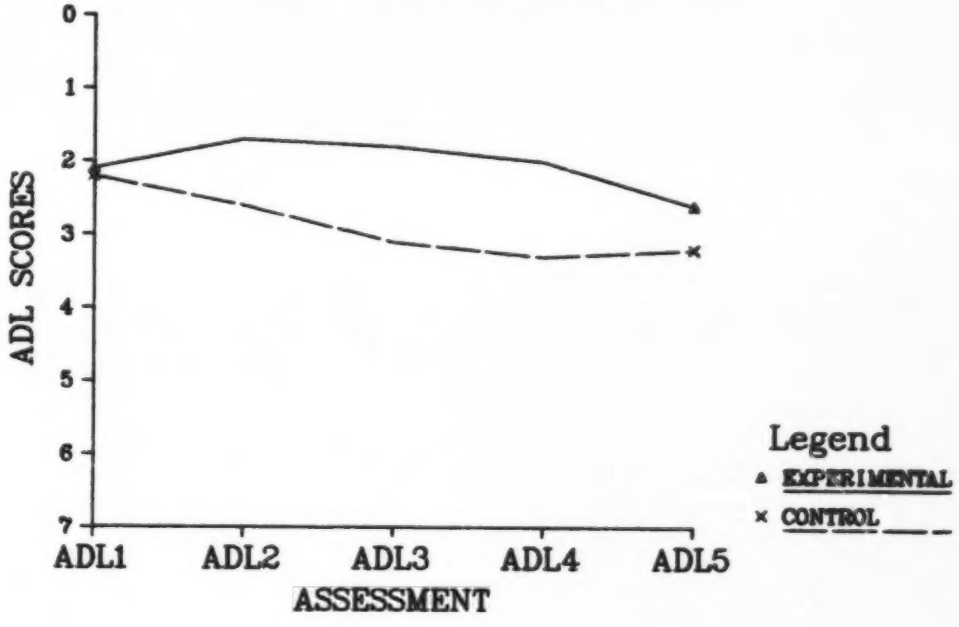
* More cases were included on the last assessment because special effort was made to gain cooperation from control group members. Some of those who had dropped out on earlier assessments agreed to participate in the final one. As these cases were included, known deaths and very dependent institutionalized patients dropped as a proportion of all control group cases. This tended to raise the average functional level of the control group by a small amount.

thereby raising its average functional level, while similar patients were kept alive in the experimental group, thus lowering its average functional level. This diminishes the apparent effect of day care on functional level.

FIGURE 1

ADL SCORES FOR THE DAY CARE STUDY GROUP BY ASSESSMENT WITH DEATH INCLUDED

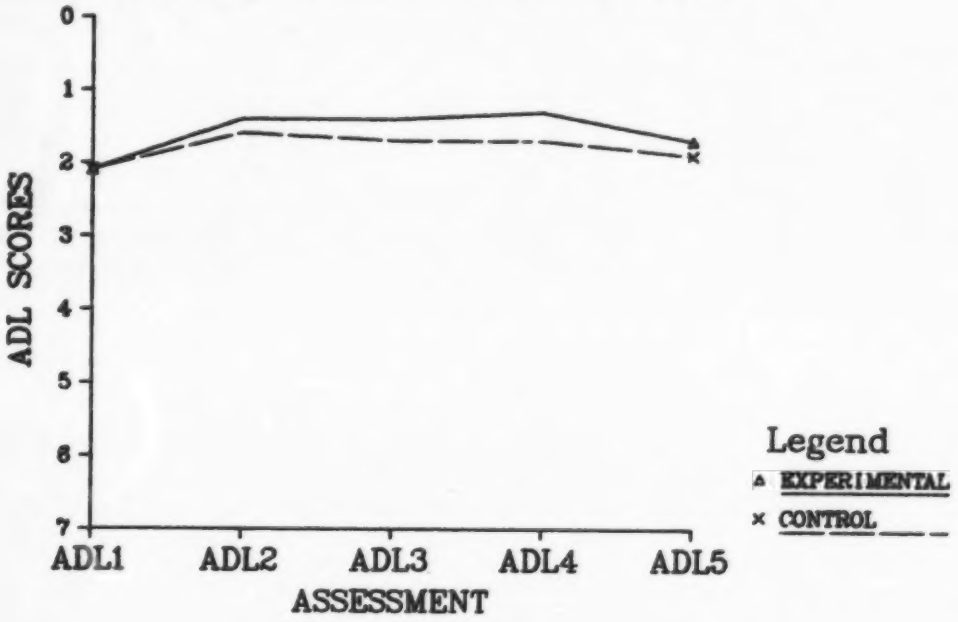


This impact of differences in death rates between the two groups is evidenced in Figure 2, which excludes patients who died during the study year. With death excluded, both groups showed some improvement between the first and last assessment with the experimental group improving to a greater degree on interim assessments than the control group. But, by the end of the study, these effects had diminished and the two groups were almost equal. Again, however, poorly functioning patients kept alive by day care probably distort the findings by reducing the average level of day care patients' functioning.

It is important to note that Figures 1 and 2 include all levels of day care utilization for experimental group members and that very real differences between high and low utilizers of day care are not evident in these figures. When ADL scores are viewed as an effect of the level of day care utilization, however, a somewhat different picture emerges. While simple correlations between the first ADL assessment and use of day care in the first quarter indicate no significant association between these variables, in the second quarter there is a significant correlation between use of services and ADL scores. This correlation becomes stronger in the next two quarters. A similar effect can be

FIGURE 2

ADL SCORES FOR THE DAY CARE STUDY GROUP BY ASSESSMENT WITH DEATH EXCLUDED



seen when the correlation figures are viewed from a "cross-lagged" approach. That is, the ADL score in the second quarter is viewed as being affected by use of day care in the first quarter, third quarter ADL scores as the effect of second quarter day care use, and so on. This method shows an increasingly strong correlation between day care use and improved ADL scores. Simply put, those patients who had higher levels of day care utilization had better ADL scores. There is no control for self-selection into high use with this approach, however, meaning that theoretically those who chose to be high users might have been patients who could have improved without day care.*

Death rates were lower for the day care experimental group than the control group, although differences in the death rate were not statistically significant. For certain subgroups, specifically those under 75 years of age and those who lived with others, death rate differences between the experimental and control groups were statistically significant.

Experimental group patients also improved or maintained their contentment, mental functioning, and activity levels in generally higher proportions than patients in the control group.

Day care costs averaged $52 per day, and $3,235 per year. When these new costs were added to Medicare costs for other services (Table 2), day care pa-

* For additional details on the cross-lagged analysis and multivariate determination of net treatment effects, see the final report.

tients averaged $2,692 more than the control group, even though hospital and nursing home costs had been reduced by lower utilization.

This finding seriously challenges the belief that this type of day care (Model I or health oriented day care, as described by Weissert[18 19]) is cheaper than nursing homes. However, Model II or social services oriented day care may still be cheaper. Weissert[17] compared the costs of nursing home reimbursement with costs of day care plus home support costs. The comparison showed that day care could save between 12 percent and 35 percent of the costs of nursing home care. But day care programs included in that comparison were predominately of the Model II variety, providing less expensive social services and staffed by non-health professionals. Consequently, average daily costs in that study were $25.09, or about half those found in the present study ($51.94). (Inflation played a small role in producing this cost difference since data for the first study preceded those of the second by about two years.)

The 1978 comparison included an important caveat which appears to have been fully warranted, however. It suggested that costs of day care—even at $25.09 per day—might not prove to be cheaper than nursing homes if the new service was used by patients not really substituting it for nursing home care. For them, day care becomes an added cost over and above existing Medicare covered service costs. These added costs offset savings realized by patients actually substituting day care for nursing home care. This phenomenon occurred in the present study.

In short, cost findings in this study show that Model I day care did not reduce costs of those who used it, even though they experienced reduced use of nursing homes. Model II day care might still be cheaper, but a study such as this one would be required to determine whether or not it is at least as effective as existing modes of care, in terms of health outcomes as well as psychosocial measures, and whether savings which might be realized through reduced institutionalization for some patients would be offset by costs of other patients using it as an additional service. Effective screening of patients to limit those served to patients "at risk" of institutionalization would improve cost-saving prospects. However, experience in the present study suggests that demand might be lower if such criteria were applied.

Medicaid-eligible patients were sought at all day care sites.* At one site, only one patient used a Medicaid-covered service. At another, 34 patients, or nearly half of the site's study group, were Medicaid beneficiaries. For two-thirds of these 34 patients, their use of Medicaid-covered services was limited to pharmaceuticals, transportation, and Medicaid payment of Medicare co-insurance and deductible amounts on their behalf. Only 4 of the 34 used Medicaid long-term nursing home benefits, that is, they entered an intermediate care facility

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* Patients were required to be Medicare but not Medicaid eligible, of course, and therefore any patient who was Medicaid-eligible only would not have been admitted to the study. But, there are probably no more than 750,000 such patients among the over-65 population nationwide, according to Social Security Administration 1975 estimates[8].

(ICF); an additional 7 used a skilled nursing facility (SNF) supported by Medicaid.**

Homemaker services: Homemaker patients averaged 368 hours of homemaker services during the study year (Table 3). All were post-hospital patients as a requirement of the study. Patients with injuries as their primary diagnosis and severely dependent patients had the highest use of services, while cancer patients had the lowest use due to death before the end of the study year. For most other patient subgroups, use varied only slightly from the overall mean.

** Copies of each Medicaid beneficiary's file were obtained from three sites. No data were obtained from the fourth site.

Study Group 2

Table 3. Homemaker utilization and its impacts on institutionalization dependency, and total Medicare payments for 630 patients[1] with selected characteristics, comparing experimental and control groups.

Patient characteristics and groups		*Homemaker hours*	*SNF[2] days*	*Hospital days*	*Maintained or increased independence[3] %*	*Total Medicare[4] payments $*
Age						
Under 75						
Experimental	(138)	365	5	21	62	10389
Control	(149)	0	3	19	62	7033**
Over 74						
Experimental	(169)	371	3	15	62	8209
Control	(174)	0	5	13	50*	4665**
Sex						
Male						
Experimental	(78)	314	4	23	54	10102
Control	(93)	0	2	17	45	5820**
Female						
Experimental	(229)	387	4	16	65	8878
Control	(230)	0	5	15	60	5732**
Race						
White						
Experimental	(278)	374	4	18	64	9289
Control	(269)	0	5	16	58	5915**
Nonwhite						
Experimental	(29)	318	2	18	48	8233
Control	(54)	0	3	13	44	4974

Table 3. Homemaker utilization and its impacts on institutionalization dependency, and total Medicare payments for 630 patients[1] with selected characteristics, comparing experimental and control groups. *(continued)*

Patient characteristics and groups		*Homemaker hours*	*SNF[2] days*	*Hospital days*	*Maintained or increased independence[3] %*	*Total Medicare[4] payments $*
Living arrangement						
Alone						
Experimental	(164)	362	3	16	66	8514
Control	(155)	0	6	15	66	5690**
With Others						
Experimental	(143)	376	4	20	58	9963**
Control	(168)	0	3	16	46*	5820
Primary diagnosis						
Circulatory disorders						
Experimental	(83)	360	2	19	59	9712
Control	(110)	0	5	17	51	6707*
Injuries						
Experimental	(35)	528	7	14	91	8780
Control	(42)	0	4	12	86	3876**
Cancer						
Experimental	(45)	209	3	21	29	8774
Control	(46)	0	4	20	28	6335
Dependency[5]						
Minimal						
Experimental	(72)	309	2	15	60	8190
Control	(96)	0	4	15	55	5641*
Moderate						
Experimental	(82)	317	4	20	63	10215
Control	(52)	0	2	18	64	.6726
Severe						
Experimental	(153)	424	5	18	63	9109
Control	(175)	0	5	16	54	5534**
All patients						
Experimental	(307)	368	4	18	62	9189
Control	(323)	0	4	16	56	5757**

[1] See footnote 1, Table 2
[2] See footnote 2, Table 2
[3] See footnote 3, Table 2
[4] See footnote 4, Table 2
[5] See footnote 5, Table 2
* Difference is significant at .05 or less.
** Difference is significant at .01 or less.

In a substantial number of subgroups, use of hospitalization or skilled nursing facility inpatient care was greater for the experimental group than the control group (Table 3). This may account for another finding—not shown here—that patients in homemaker services were less likely to die during the study year

than control group patients. (Death rate differences were significantly lower for homemaker experimental group patients than controls.) It may be that the homemaker serves as health counselor to the patient and suggests institutionalization, which in turn reduces death rates, or that patients kept alive by homemaker services are more likely to be institutionalized.

Measures of contentment, mental functioning, and social activity show that higher proportions of the homemaker experimental group had favorable outcomes than did the control group. The difference in contentment was statistically significant.

Net Medicare costs for homemaker services were $3,432 higher for homemaker patients than for control group members (Table 3). These included average hourly costs of $7.61 and average yearly costs of $2,290 for homemaker services (not shown in table).

Medicaid data were obtained for beneficiaries at two sites. They showed that 26 patients (10 percent of the study population) at one site and 25 patients (24 percent of the study population) at the other site were Medicaid beneficiaries. Most of these had low rates of Medicaid benefit utilization, and only two patients at one site and none at the other entered a long-term nursing home (ICF). Nine patients at one site and two at the other site entered a Medicaid supported skilled nursing facility (SNF).

Both services combined: A small group of patients received both services. They averaged 46 days of day care per year and 195 hours of homemaker services (Table 4). All were post-hospital patients as a requirement of the study. Severely dependent and non-white patients were among the higher utilizers of services, and again, cancer patients were low utilizers because they died before the study ended.

The two services together appeared to have some impact upon institutionalization. For all patients combined, there was reduced use of skilled nursing facilities by an average of two days (Table 4). Moderately dependent patients' use was reduced by nine days. Hospitalization was reduced by seven days for experimental group patients compared to control group patients. Male patients were the largest beneficiaries.

The proportion of combined services experimental group patients who died during the study year was significantly lower than in the control group. The fact that 49 percent of those to whom both services were offered used only one or neither, however, indicates that self-selection may be an important factor in explaining these results and must be considered when interpreting findings based upon this group.

The combined services experimental group had significantly higher proportions of patients who improved or were maintained in contentment, mental functioning, and social activity than did the control group.

The two services together raised total net Medicare costs by $2,338.

Table 4. Day care and homemaker utilization and their combined impacts on institutionalization, dependency, and total Medicare payments for 139 patients[1] with selected characteristics, who received both services, comparing experimental and control groups.

Patient characteristics and groups		*Day care days*	*Homemaker*	*SNF[2] days*	*Hospital days*	*Maintained or increased independence[3] %*	*Total Medicare[4] payments $*
Age							
Under 75							
Experimental	(33)	43	208	6	10	73	8102
Control	(34)	0	0	4	16	62	5236
Over 74							
Experimental	(26)	51	178	3	14	65	9156
Control	(46)	0	0	7	19	52	6961
Sex							
Male							
Experimental	(19)	55	201	6	13	74	10180
Control	(30)	0	0	2	11	43*	4264**
Female							
Experimental	(40)	42	193	4	11	68	7800
Control	(50)	0	0	8	22	64	7406
Race							
White							
Experimental	(49)	44	183	4	10	74	7766
Control	(69)	0	0	6	18	58	6487
Nonwhite							
Experimental	(10)	58	255	7	20	50	12489
Control	(11)	0	0	2	15	46	4603
Living arrangement							
Alone							
Experimental	(32)	36	184	4	12	75	7746
Control	(34)	0	0	9	22	56	7633
With others							
Experimental	(27)	59	209	5	11	63	9539
Control	(46)	0	0	4	15	57	5189*
Primary diagnosis							
Circulatory disorders							
Experimental	(19)	46	156	9	17	58	9846
Control	(33)	0	0	5	14	52	5272*
Injuries							
Experimental	(9)	43	190	4	3	67	5882
Control	(12)	0	0	2	9	83	4517

Table 4. Day care and homemaker utilization and their combined impacts on institutionalization, dependency, and total Medicare payments for 139 patients[1] with selected characteristics, who received both services, comparing experimental and control groups. *(continued)*

Patient characteristics and groups		*Day care days*	*Homemaker*	*SNF[2] days*	*Hospital days*	*Maintained or increased independence[3] %*	*Total Medicare[4] payments $*
Dependency[5]							
Minimal							
Experimental	(13)	53	139	7	12	46	8211
Control	(16)	0	0	5	23	31	7580
Moderate							
Experimental	(16)	34	197	4	5	69	6359
Control	(22)	0	0	13	27	59	8837
Severe							
Experimental	(30)	50	218	4	15	80	9898
Control	(42)	0	0	2	11	64	4346**
All patients							
Experimental	(59)	46	195	4	11	70	8566
Control	(80)	0	0	6	18	56	6228

[1] See footnote 1, Table 2
[2] See footnote 2, Table 2
[3] See footnote 3, Table 2
[4] See footnote 4, Table 2
[5] See footnote 5, Table 2
*Difference is significant at .05 or less.
** Difference is significant at .01 or less.

Summary of findings

26 Day care

1. *Use of services:*
   - Providers offering day care services found it difficult to find enough patients to meet their patient population goals. Intake periods had to be extended and reextended. Medicaid-eligible patients were particularly few in number at some sites. This may suggest low demand for these services.
   - One-fourth of patients randomly assigned to day care failed to use the new services. Their characteristics suggest that for many, poor health status or death may have been the reason for nonuse.
   - The average number of days of day care attendance was 70 for the year.
   - A majority of patients (58 percent) spread their use of services evenly throughout the year. Others concentrated it into one or two quarters.

2. *Institutionalization:*
   - Day care patients had fewer days in a skilled nursing facility: four days versus nine for the control group. This difference is statistically significant. Hospital days were lower for day care patients than the control group (10 versus 13 days). The difference is not statistically significant.
   - For the majority of patients, day care probably served as an additional benefit under Medicare, rather than one which was substituted for nursing home care. This is suggested by the fact that rates of use of skilled nursing facilities were 11 percent in the experimental group and 21 percent in the control group.

3. *Physical functioning:*
   - The experimental group showed better physical functioning levels than the control group, but when death was excluded as a functional state, differences became smaller. Differences also appeared to diminish over time, making it uncertain whether they would persist in an on-going program. Ignoring the experimental and control group designation and concentrating on only those who used day care, high use was associated with better functioning ability.

4. *Other outcome measures:*
   - Higher proportions of day care experimental than control group patients improved or maintained in levels of contentment, mental functioning, and social activity.

- The day care experimental group had lower death rates than the control group, but differences were not statistically significant.

5. *Costs:*
   - Average day care cost was $52 per day and $3,235 per year.
   - Day care patients had reduced use of existing Medicare-covered services making their costs for these services about $543 lower than control group patients, but these savings were more than offset by day care costs.
   - Net total Medicare costs (day care plus existing services) were $6,501 for day care patients and $3,809 for control patients—a difference of $2,692. In other words day care increased overall costs by 71 percent despite reduced institutionalization. Of course some of these costs were incurred for patients whom the new service probably kept alive.

Homemaker Services

1. *Use of service:*
   - It took providers of homemaker services much longer than expected to meet their patient population goals. This may be an indication that there is lower than expected demand for these services.
   - Of those offered homemaker services, 20 percent failed to use them. The nonusers tended to be older, sicker, and more likely to die than users.
   - Patients received an average of 368 hours of service per year.

2. *Institutionalization:*
   - Skilled nursing facility use was the same for the experimental and control groups (four days for both).
   - Hospitalization was higher among experimental patients: 18 days versus 16 days. (This hospitalization in the experimental group was associated with lower death rates for this group.) The difference in hospitalization was not statistically significant.

3. *Other outcome measures:*
   - Higher proportions of homemaker experimental group than control group patients improved or maintained in levels of contentment, mental functioning, and social activity. The difference in contentment was statistically significant.
   - Significantly lower proportions of homemaker experimental group patients died than control group patients, but higher use of hospitals by the experimental group may have been the reason.

4. *Costs:*
   - Homemaker services cost $7.61 per hour or $2,290 per year.
   - Homemaker patients had higher utilization of existing Medicare-covered services and consequently higher costs for these services compared to the control group.
   - Net Medicare costs (including homemaker services) were $9,189 for ex-

perimental patients and $5,757 for control patients, a difference of $3,432 (or 60 percent) higher than the control group.

Combined services

A small group of patients received both day care and homemaker services. Because of the small numbers, compounded by problems of possible self-selection, findings concerning the two services together may not be as reliable as those presented above.

1. *Use of services:*
   - Among those offered both services, 49 percent used only one or neither. Nonusers were older, sicker, and more likely to die than users.
   - Average number of day care days used per patient was 46 days per year.
   - Average number of homemaker service hours used per patient was 195 hours.
2. *Institutionalization:*
   - Skilled nursing facility use was lower by two days for the experimental group. The difference is not statistically significant.
   - Hospitalization was lower by seven days for the experimental group. The difference is not statistically significant.
3. *Other outcome measures:*
   - Significantly higher proportions of combined services experimental group than control group patients improved or maintained in levels of contentment, mental functioning, and social activity.
   - The proportion of combined services experimental group patients who died during the study year was significantly lower than the control group.
4. *Costs:*
   - Net Medicare costs were $8,566 for the experimental group and $6,228 for the control group, a difference of $2,338 (or 38 percent) higher than the control group.

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(HRA) 77-3176 Quality of Medical Care Assessment Using Outcome Measures (PB 272 455)
(HRA) 77-3183 Recent Studies in Health Services Research, Vol. II (CY 1976) (PB 279 198)
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(PHS) 78-3192 Assessing the Quality of Long-Term Care
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(PHS) 79-3241 NCHSR Research Priorities

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The *Research Proceedings Series* extends the availability of new research announced at key conferences, symposia and seminars sponsored or supported by NCHSR. In addition to papers presented, publications in this series include discussions and responses whenever possible. The series is intended to help meet the information needs of health services providers and others who require direct access to concepts and ideas evolving from the exchange of research results.

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(HRA) 77-3186 International Conference on Drug and Pharmaceutical Service Reimbursement (PB 271 386)
(PHS) 78-3195 Emergency Medical Services: Research Methodology (PB 279 096)
(PHS) 78-3207 Health Survey Research Methods, Second Biennial Conference
(PHS) 78-3208 Drug Coverage Under National Health Insurance
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(PHS) 79-3225-1 Emergency Medical Services Research Methodology—Workshop I
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(PHS) 79-3228 A National Conference on Health Policy, Planning, and Financing the Future of Health Care for Blacks in America
(PHS) 79-3233 Emergency Medical Services Systems as a Health Services Research Setting

Program Solicitations

(HRA) 77-3196 Conference Grant Information
(PHS) 78-3224 Grants for Dissertation Research Support
(PHS) 79-3240 Grants for Research on Quality and Economy of Drug Prescribing

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15. Supplementary Notes

See unabridged report, bearing same main title, obtainable from the authors.

16. Abstracts

This study was a randomized experiment carried out by the National Center for Health Services Research. It was designed to examine the effects of adult day care and homemaker services on a Medicare-eligible population and to assess the impacts of those services on institutionalization and Medicare costs. Differences between experimental and control groups in health outcomes and psycho-social measures were compared, and patients were identified for whom the new services might prove more effective than existing options. Difficulty in enrolling patients in the program and low utilization rates for some groups of patients may suggest low demand for these services. The study suggests that for the majority of patients, day care and homemaker services probably served as additional benefits under Medicare, rather than substitutes for nursing home care. Net total Medicare costs (the new services plus existing Medicare services) were 71 percent higher for the day care experimental group and 60 percent higher for the homemaker experimental group. Experimental/control group differences in physical functioning, psycho-social measures, and death rates are discussed.

~~17. Key Words and Document Analysis. 17a. Descriptors~~

16. Abstracts (cont'd.)

NCHSR publication of research findings does not necessarily represent approval or official endorsement by the National Center for Health Services Research or the U.S. Department of Health, Education, and Welfare.

17b. Identifiers/Open-Ended Terms

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